

SEP 10 2007

Application No. 09/520,004
Amendment dated: September 10, 2007
Reply to Office Action of 3/8/07

Docket No.: 61755(61035)

REMARKS

Claims 2-21 are pending in the instant application. Claim 1 stands canceled. Claims 2, 12, 14, and 16-20 have been amended to more clearly delineate the instant invention and to correct typographical errors. Support for these amendments appears throughout the specification and claims as filed. No new matter is introduced by these amendments. Applicants make these amendments without prejudice to pursuing the original subject matter of this application in a later filed application claiming benefit of the instant application, including without prejudice to any determination of equivalents of the claimed subject matter.

Rejection under 35 U.S.C. § 112, second paragraph

Claims 2-21 are rejected, allegedly for being confusing and disjointed, and lacking antecedent basis for the following recited terms: aqueous process medium, hop acid, aqueous alkaline medium, aqueous alkaline hop acid solution, and yeast hop acid mixture. Applicants traverse.

Applicants have amended claims 2, 12 and 14 to clarify the steps and terms of each respective claim. In claim 2, a hop acid is added to an aqueous alkaline medium in step a) to form a new solution, called an aqueous alkaline hop acid solution. The solution of step a) is combined with yeast in step b) to form a new mixture, called a yeast/aqueous alkaline hop acid mixture. This mixture is then added to an aqueous process medium in step b). Step c) confirms that the aqueous alkaline hop acid solution is continuously added pre-fermentation to the aqueous process medium. In claim 12, each reference to a "solution" or "medium" is now uniquely defined by source (i.e., the step it emanates from). In claim 14, the claim is amended to recite process steps. Applicants submit that the amended claims now particularly point out and distinctly claim the claimed subject matter and respectfully request withdrawal of the rejection.

Claim 2 is rejected, allegedly for lacking antecedent basis for the phrase "the aqueous process medium," in step b). Applicants traverse. Applicants have amended claim 2 to recite "an aqueous process medium". Applicants submit that the rejection is mooted and respectfully request withdrawal of the rejection.

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Claim 2 is rejected, as allegedly indefinite for the term "controlling." Applicants traverse. The specification is clearly directed towards controlling the growth micro-organisms and decreasing or inhibiting the number of micro-organisms (e.g., bacteria). Examples 1, 2, 3, and 5 clearly show that the bacterial levels decreases upon addition of the alkaline hop acids solution. Applicants have amended claim 2 to recite "inhibiting", which Applicants submit is definite. On this basis, withdrawal of the rejection is respectfully requested.

Claim 12 is rejected, allegedly for lacking antecedent basis. Regarding the phrase "the final concentration," Applicants have amended claim 12 to delete the term "the" and to add the term "a." Regarding the term "mixture" in steps (c) and (f), Applicants have amended those steps to recite the source of the respective mixture (i.e., step (d) and step (e), respectively). Regarding the phrase "the solution of hop acids" in step (g), Applicants have amended that step to recite the source of the respective solution (i.e., step (f)). Applicants contend that the amendments herein have addressed the rejections and respectfully request withdrawal of the rejections.

Claim 12 is rejected, allegedly for being confusing and disjointed. As stated above, in claim 12, each reference to a "solution" or "medium" is now uniquely defined by source (i.e., the step it emanates from) and reference terminology. Regarding the term "raised temperature," Applicants have amended step (e) to include the temperature of step (a). Support for the amendments can be found in the specification as filed, at least at page 7, lines 6-22, Example 1 on page 12, and Figure 1. As such, Applicants submit that the rejections are overcome and withdrawal of the rejections is requested.

Claim 14 is rejected, allegedly for being confusing regarding how a process may comprise equipment, and how a hop acid is related to the claim. Claim 16 is also rejected, allegedly for lacking antecedent basis. Applicants traverse but have amended claims 14 and 16-20 to more clearly delineate the instant invention. Support for the amendments can be found at least at Figure 2 of the application as filed, which shows a schematic drawing of a fermentable solution which is diluted, contacted with aqueous alkaline hop acid solution, and added to one or both of a yeast growing tank and to a fermentation tank. Figure 2 also shows that the contents of

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the yeast growing tank are added to the fermentation tank. Based on the amendments, Applicants request that the rejection be withdrawn.

Rejection under 35 U.S.C. § 103(a)

Claims 2-6, 8-11, 14-15, and 20-21 are rejected as being unpatentable over Todd et al. (US 5,082,975). It is alleged that Todd discloses the synthesis of hexahydrolupulone and its use as a selective inhibitor of cell growth. Specifically, it is alleged that the pH of the aqueous hop acid solution or the pH of the process medium is not provided in Todd, but that the process medium of Todd would inherently have a high pH due to the hydroxide ions. It is further alleged that it would have been obvious to use the teachings of Todd to inhibit the growth of unwanted cells except for yeast. Applicants disagree and respectfully traverse.

Todd actually relates to synthetic methodology for making hexahydrolupulone compounds. The motivation for making the alkaline solution of hexahydrolupulone in the Todd Example 5 is to purify it away from the hydrogenation poisons used in the synthetic process. The Todd Example 6 describes treatment with hexahydrolupulone (i.e., not in the alkaline aqueous form), and indicates only that fermentation inoculated with yeast was "not inhibited".

The Todd examples do not show treatment of any media with alkaline hop acid solutions. Todd also does not disclose treatment pre-fermentation of the yeast growing tank, fermentation tank, fermentable feed or the yeast itself, which is an aspect of the instantly claimed technology.

Moreover, Applicants submit herewith a declaration under 37 CFR 1.132 by Mr. Shaun O' Riley, Operations Manager and Lab Manager of Golden Triangle Energy LLC, and a copy of a print ad featuring Mr. Riley regarding his experience with fermentation processes. Mr. Riley supervised laboratory and industrial production scale fermentation runs where alkali hop acids were introduced pre-fermentation into a yeast propagation vessel to inhibit bacterial infection. At both the laboratory and production scale, significant increase in fuel ethanol production were observed over the same runs using typical antibiotics (about 30,000 gal increase at the production level). Furthermore, the increased fuel ethanol yield using the alkaline hop acid solution introduced pre-fermentation was obtained using fewer bushels of feedstock compared to the runs using typical antibiotics. These observations were surprising and unexpected.

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To establish a *prima facie* case of obviousness, three criteria need be met: (i) there must be a suggestion or motivation to modify the reference or combine the teachings; (ii) there must be a reasonable expectation of success; and (iii) the prior art reference must teach or suggest all the claim limitations. See, MPEP 2143. Applicants submit that Todd does not provide any motivation, reasonable expectation of success, or provide a disclosure of all of the Applicants' claim limitations; and furthermore Todd does not provide any insight into the surprising and unexpected results observed by Mr. Riley. As such, Applicants submit that the *prima facie* case is overcome and respectfully request withdrawal of the rejection.

Claims 7 and 16-19 are rejected as being unpatentable over Todd et al. (US 5,082,975) in view of Simpson, W. J. (J. Inst. Brew., 1987, 93, pp. 405-406). It is alleged that Todd, as described *supra*, discloses the synthesis of hexahydrolupulone and its use as a selective inhibitor of cell growth, but does not disclose isomerized hop acids. It is further alleged that Simpson discloses alkaline aqueous solutions of isomerized hop acids, and that it would have been obvious to modify the disclosure of Todd to include the Simpson alkaline aqueous solutions of isomerized hop acids. Applicants disagree and respectfully traverse.

As discussed above, the Todd examples do not show treatment of any media with alkaline hop acid solutions. Todd also does not disclose treatment pre-fermentation of the yeast growing tank, fermentation tank, fermentable feed or the yeast itself, which is an aspect of the instantly claimed technology. Simpson relates to a study of acid washing of pitching yeast slurries. Thus, Simpson relates to used yeast (that is, post fermentation), which is different and distinguishable from Applicants' pre-fermentation technology. As such, Simpson fails to disclose treatment pre-fermentation of the growing tank, fermentation tank, fermentable feed or the yeast itself, which is an aspect of the instantly claimed technology. Furthermore, Todd et al. and Simpson do not provide any insight into the surprising and unexpected results seen by Mr. Riley as detailed above. As such, Applicants submit that the *prima facie* case is overcome and respectfully request withdrawal of the rejection.

Claims 12 and 13 are rejected as being unpatentable over Todd et al. (US 5,082,975) in view of Simpson, W. J. (J. Inst. Brew., 1987, 93, pp. 405-406), and further in view of Todd et al. (US 4,002,683). It is alleged that Todd ('975) and Simpson, as described *supra*, disclose the methods of the instant invention, and that Todd ('683) further discloses a process for isomerizing

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alpha acids to iso-alpha acids. It is further alleged that it would have been obvious to modify the teachings of Todd ('975), Simpson, and Todd ('683) to arrive at an aqueous alkaline iso-alpha hop acid solution as described by Todd ('683). Applicants disagree and respectfully traverse.

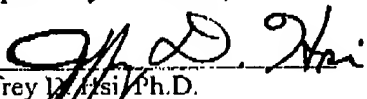
As discussed above, the Todd ('975) examples do not show treatment of any media with alkaline hop acid solutions. Simpson relates to used yeast (that is, post fermentation), which is different and distinguishable from Applicants' pre-fermentation technology. Todd ('683) also does not disclose treatment pre-fermentation of the yeast growing tank, fermentation tank, fermentable feed or the yeast itself, which is an aspect of the instantly claimed technology. As such, Todd ('975), Simpson and Todd ('683) fail to disclose treatment pre-fermentation of the growing tank, fermentation tank, fermentable feed or the yeast itself, which is an aspect of the instantly claimed technology. Furthermore, Todd ('975), Simpson and Todd ('683) do not provide any insight into the surprising and unexpected results seen by Mr. Riley as detailed above. As such, Applicants submit that the *prima facie* case is overcome and respectfully request withdrawal of the rejection.

In view of the above remarks, Applicants believe the pending application is in condition for allowance. Should any of the claims not be found to be allowable, the Examiner is requested to telephone Applicants' undersigned representative at the number below. Applicants thank the Examiner in advance for this courtesy.

The Director is hereby authorized to charge or credit any deficiency in the fees filed, asserted to be filed or which should have been filed herewith (or with any paper hereafter filed in this application by this firm) to our Deposit Account No. 04-1105, under Order No. 51035-61755.

Dated: September 10, 2007

Respectfully submitted,

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